

1 **CLAIMS**

2 1. A method for operating a network system having a content provider  
3 which provides content over a network through local service providers to multiple  
4 content rendering units, the method comprising the following steps:

5 identifying a peak time when a plurality of the content rendering units are  
6 likely to request the content supplied by the content provider;

7 sending at least some of the content from the content provider to the local  
8 service provider prior to the peak time; and

9 storing the content received from the content provider at the local service  
10 provider for use during the peak time.

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12 2. A method as recited in claim 1, wherein the sending step is performed  
13 without being requested by the content rendering units.

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15 3. A method as recited in claim 1, wherein the content comprises  
16 streaming audio or video data.

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18 4. A method as recited in claim 1, further comprising the step of  
19 requesting, by the local service provider, the content based on the results of the  
20 identifying step.

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22 5. A method as recited in claim 1, and further comprising:  
23 monitoring usage patterns of the content;  
24 scheduling early sending of the content at a time prior to the peak time  
25 based on the usage patterns.

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2 6. A method as recited in claim 1, and further comprising the step of  
3 serving the content from the local service provider to requesting content rendering  
4 units during the peak time.

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6 7. A method as recited in claim 1, wherein:  
7 the identifying step comprises designating a peak time in terms of discrete  
8 time slots as covering an ending portion of at least one time slot and a beginning  
9 portion of at least one subsequent time slot; and

10 the sending step comprises sending the content that is likely to be requested  
11 in the subsequent time slot prior to the peak time.

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13 8. A method as recited in claim 1, and further comprising the following  
14 steps:

15 customizing a set of prioritized content according to requests made by the  
16 content rendering units; and

17 selectively sending the set of prioritized content to the local service  
18 provider prior to the peak time.

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20 9. A method as recited in claim 1, and further comprising the step of  
21 assigning a time-to-live tag to the content to indicate when the content is expected  
22 to be updated.  
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1        10. A method as recited in claim 1, and further comprising the step of  
2 estimating, at the local service provider, a time-to-live tag for the content received  
3 from the content provider to indicate when the content is expected to be updated.  
4

5        11. A method as recited in claim 10, wherein the estimating step  
6 comprises deriving the time-to-live tag based upon a time since the content was  
7 last updated.  
8

9        12. In a network system having a content provider which provides  
10 content over a network through a local service provider to multiple content  
11 rendering units, a method for operating a local service provider comprising the  
12 following steps:

13        monitoring usage patterns to detect highly requested content;  
14        identifying from the usage patterns a peak time when a plurality of the  
15 content rendering units are likely to request the content;  
16        scheduling delivery of the highly requested content at a scheduled time  
17 prior to the peak time;  
18        receiving the highly requested content from the content provider at the  
19 scheduled time prior to the peak time; and  
20        storing the highly requested content received from the content provider for  
21 use during the peak time.  
22

23        13. A method as recited in claim 12, wherein the content comprises  
24 streaming audio or video data.  
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1           14.    A method as recited in claim 12, and further comprising the step of  
2   modifying target specifications, which are used by the local service provider to  
3   reference the content stored at the content provider, to instead reference the  
4   content stored at the local service provider.

5  
6           15.    A method as recited in claim 12, and further comprising the step of  
7   serving the stored content to requesting content rendering units during the peak  
8   time.

9  
10          16.    A method as recited in claim 12, and further comprising the step of  
11   estimating, at the local service provider, a time-to-live tag for the content received  
12   from the content provider to indicate when the content is expected to be updated.

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14          17.    A method as recited in claim 16, wherein the estimating step  
15   comprises deriving the time-to-live tag based upon a time since the content was  
16   last updated.

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18          18.    A computer programmed to perform the steps in the method as  
19   recited in claim 16.

20  
21          19.    A method for operating a network system having a content provider  
22   which provides content through a local service provider to multiple content  
23   rendering units, the content being provided from the content provider to the local  
24   service provider over a first network, the method comprising the following steps:  
25

1 distributing supplemental content from the content provider to the local  
2 service provider over a second network; and

3 storing selected portions of the supplemental content received from the  
4 content provider in a cache at the local service provider for use in serving the  
5 content rendering units.

6  
7 20. A method as recited in claim 19, wherein the supplemental content  
8 comprises streaming audio or video data.

9  
10 21. A method as recited in claim 19 wherein the second network  
11 comprises a satellite network and the distributing step comprises the step of  
12 broadcasting the supplemental content

13  
14 22. A method as recited in claim 19, and further comprising the step of  
15 choosing the selected portions of the supplemental content to be stored at the local  
16 service provider based upon usage patterns exhibited by the content rendering  
17 units.

18  
19 23. A method as recited in claim 19, and further comprising the step of  
20 serving the distributed content from the local service provider to requesting  
21 content rendering units.

1        24. A method as recited in claim 19, and further comprising the  
2 following steps:

3        identifying a peak time when a plurality of the content rendering units are  
4 likely to request the content stored at the content provider; and

5        distributing the supplemental content from the content provider to the local  
6 service provider over the second network prior to the peak time.

7  
8        25. A method as recited in claim 19, and further comprising the step of  
9 assigning a time-to-live tag to the supplemental content to indicate when the  
10 content is expected to be updated.

11  
12        26. A method as recited in claim 19, and further comprising the step of  
13 estimating, at the local service provider, a time-to-live tag for the supplemental  
14 content received from the content provider to indicate when the supplemental  
15 content is expected to be updated.

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17        27. A method as recited in claim 26, wherein the estimating step  
18 comprises deriving the time-to-live tag based upon a time since the supplemental  
19 content was last updated.

20  
21        28. A system for providing content to user content rendering units,  
22 comprising:

23        a content provider having storage for storing the content;

24        at least one local service provider to facilitate access to the content stored at  
25 the content provider on behalf of the content rendering units;

1 a distribution network interconnecting the program provider and the local  
2 service provider; and

3 the local service provider being configured to request certain content from  
4 the content provider prior to a peak time when multiple content rendering units are  
5 likely to request the content and to cache the content received from the content  
6 provider for serving to requesting content rendering units during the ensuing peak  
7 time.

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9 29. A system as recited in claim 28, wherein the local service provider  
10 using target specifications to request the content stored at the content provider for  
11 serving to the content rendering units, the local service provider modifying the  
12 target specifications to reference the content cached at the local service provider  
13 instead of referencing that same content at the content provider.

14  
15 30. A system as recited in claim 28, wherein the content provider  
16 assigns a time-to-live tag to the content to indicate when the content is expected to  
17 be updated.

18  
19 31. A system as recited in claim 28, wherein the local service provider is  
20 configured to estimate a time-to-live tag for the content to indicate when the  
21 content is expected to be updated.

1           32.    A system as recited in claim 28, and further comprising at least one  
2 content rendering unit connected to the local service provider to facilitate access to  
3 the content served by the content provider, the local service provider serving the  
4 content cached locally to the content rendering unit during the peak time.

5  
6           33.    A system for providing content to user content rendering units,  
7 comprising:

8           a content provider having storage for storing the content;  
9           at least one local service provider to facilitate access to the content stored at  
10 the content provider on behalf of the content rendering units;  
11           an interactive network interconnecting the content provider and the local  
12 service provider;  
13           a broadcast network;  
14           the content provider being configured to broadcast at least some of the  
15 content over the broadcast network to the local service provider; and  
16           the local service provider being configured to cache the broadcasted content  
17 for serving to requesting content rendering units.

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19           34.    A system as recited in claim 33, wherein the broadcast network  
20 comprises a satellite network.



1        35. A system as recited in claim 33, wherein the local service provider  
2 uses target specifications to request the content stored at the content provider for  
3 serving to the content rendering units, the local service provider being configured  
4 to modify the target specifications to reference the broadcasted content cached at  
5 the local service provider instead of referencing that same content at the content  
6 provider.

7  
8        36. A system as recited in claim 33, wherein the content provider  
9 assigns a time-to-live tag to the broadcasted content to indicate when the content is  
10 expected to be updated.

11  
12        37. A system as recited in claim 33, wherein the local service provider is  
13 configured to estimate a time-to-live tag for the broadcasted content to indicate  
14 when the broadcasted content is expected to be updated.

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16        38. A system as recited in claim 33, and further comprising at least one  
17 content rendering unit connected to the local service provider to facilitate access to  
18 the content served by the content provider, the local service provider serving the  
19 content cached locally to the content rendering unit.  
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1        39. A local service provider for facilitating delivery of continuous data  
2 content from a content provider to individual content rendering units, the content  
3 serving unit comprising:

4        a computer programmed to detect a peak time when the content rendering  
5 units are likely to request the particular target resource and to schedule a request  
6 for the particular target resource at a selected time prior to the peak time;

7        a cache memory to store the particular target resource received from the  
8 content provider in response to the scheduled requests;

9        a continuous media server to store any continuous data files referenced in  
10 the particular target resource; and

11       the computer being further programmed to serve the particular target  
12 resource stored in the cache memory to a content rendering unit during the peak  
13 time, and if requested by the content rendering unit, to initiate transmission of a  
14 continuous data file from the continuous media server that is referenced in the  
15 target resource.

16  
17       40. A local service provider as recited in claim 39, wherein the target  
18 resource in the cache memory contains target specifications to remote locations  
19 where the continuous data files are stored remotely from the content serving unit,  
20 and the computer is programmed to change the target specifications within the  
21 cached target resource to reference the continuous data files stored in the  
22 continuous media server.

1 41. A local service provider as recited in claim 39, wherein the  
2 computer is programmed to estimate a time-to-live tag for the target resources  
3 received from the content provider to indicate when the target resources are  
4 expected to be updated.

5  
6 42. A content serving unit for facilitating delivery of content from a  
7 content provider to individual content rendering units, the content serving unit  
8 comprising:

9 a computer;  
10 a storage medium connected to the computer;  
11 a network port responsive to the computer to request and receive content  
12 from the content provider over a network;  
13 a receiver to receive a signal from the content provider, the signal carrying  
14 additional content; and  
15 the computer being programmed to store the additional content received at  
16 the receiver in the storage medium.

17  
18 43. A content serving unit as recited in claim 42, wherein the computer  
19 is programmed to monitor usage patterns of the content and to schedule requests  
20 for the content so that the content is received from the content provider at a time  
21 prior to the peak time.  
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1 44. A content serving unit as recited in claim 42, wherein the computer  
2 is programmed to serve the additional content stored in the storage medium to a  
3 content rendering unit in response to a request from the content rendering unit.

4  
5 45. A content serving unit as recited in claim 42, further comprising:  
6 a memory to store target specifications for referencing the content at the  
7 content provider; and

8 the computer being programmed to change the target specifications to  
9 reference the content stored in the storage medium instead of referencing that same  
10 content at the content provider.

11  
12 46. A content serving unit as recited in claim 42, wherein:  
13 the network port comprises a connector compatible with a wire-based  
14 communications network; and

15 the receiver comprises a receiver capable of receiving signals conveyed  
16 through a wireless medium.

17  
18 47. A content serving unit as recited in claim 42, wherein the computer  
19 is programmed to estimate a time-to-live tag for the content received from the  
20 content provider to indicate when the content is expected to be updated.

21  
22 48. A content provider, comprising:  
23 a storage system to store content;  
24 a server connected to the storage system to serve the content to requesting  
25 clients; and

1 the server being programmed to serve early at least some of the content to  
2 the clients prior to a peak time when the clients are likely to request the content.

3  
4 49. A content provider as recited in claim 48, wherein the server is  
5 programmed to assign a time-to-live tag to the content to indicate when the content  
6 is expected to be updated.

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8 50. A content provider as recited in claim 48, wherein the server serves  
9 multiple clients, the server being programmed to serve early different sets of  
10 content for different ones of the clients.

11  
12 51. A content provider, comprising:  
13 a storage system to store content;  
14 a server connected to the storage system to serve the content to requesting  
15 clients;  
16 a network port adapted for connection to a network, the server serving the  
17 content through the network port to the clients in response to requests from those  
18 clients; and  
19 a transmitter, responsive to the server, to transmit content over a second  
20 network to the clients.

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22 52. A content provider as recited in claim 51, wherein:  
23 the network port comprises a connector compatible with a wire-based  
24 communications network; and  
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the transmitter comprises a transmitter capable of transmitting signals over  
~~a wireless medium~~

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